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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/298,306	04/23/1999	ERIC R. FOSSUM	08305/035001	1901

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EXAMINER

TRAN, NHAN T

ART UNIT	PAPER NUMBER
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2615

DATE MAILED: 03/26/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/298,306

Applicant(s)

FOSSUM ET AL.

Examiner

Nhan T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 18-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/23/2003 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-11, 13-16, 18-21 have been considered but are moot in view of the new ground(s) of rejection.

3. Furthermore, the indicated allowability of claim 12 is withdrawn in view of the newly discovered reference(s) to Kaplinsky et al (US 5,822,222) and Van de Poel et al (US 6,061,091). Rejections based on the newly cited references follow.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 & 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kaplinsky et al (US 5,822,222).

Regarding claim 1, Kaplinsky discloses an automatic exposure adjusting device, comprising:

an image sensor having a plurality of pixels, and further having an adjustment capability (see col. 2, lines 7-10; col. 10, lines 52-55);

an analog to digital converter (12 bit A/D converter) which produces digital output comprising a plurality of bits, the digital output indicative of an output of each pixel of the image sensor;

a first counter which counts a number of overexposed parts (e.g., too bright photodetectors) of the digital output; a second counter which counts a number of underexposed parts of the digital output (e.g., too dark photodetectors); a plurality of threshold detectors for comparing counting results of the first and second counters with desired thresholds (e.g., bright and dark thresholds set by user);

a decision element, which makes a decision to either increase or decrease an exposure of the image sensor (by changing an integration time of the image sensor) based on a relation with thresholds (see col. 11, lines 21-42).

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Regarding claim 13, Kaplinsky discloses that the exposure is one of a shutter width (e.g., integration time) (see col. 11, lines 38-42).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-5, 7-9, 11, 14-16, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplinsky et al (US 5,822,222) in view of Baumeister (US 4,684,995).

Regarding claim 2, Kaplinsky teaches a coincidence detector that reviews a 12 bit digitized video signal for the exposure control (col. 11, lines 30-42). Kaplinsky fails to teach that the coincidence detector to review only a predetermined number of most significant bits of the digital output.

Baumeister teaches an automatic exposure control processing (32) that reviews only the most significant bits (MSB) of digital image data output from an A/D converter (24) since the most significant bits of the digital image data provide sufficient image information to determine proper exposure (see Fig. 1; col. 2, lines 52-57).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the automatic exposure control processing in Kaplinsky by reviewing only the most significant bits (MSB) of the digital image data output from the A/D converter instead of reviewing all 12 bits since the most significant bits would provide sufficient image information to determine proper exposure and would further reduce autoexposure processing time.

Regarding claim 3, inherent in the combination of Kaplinsky and Baumeister is a number of pixels whose most significant bits include ones (logical ones) are counted since the too bright photodetectors/pixels in Kaplinsky inherently output high intensity values which correspond to logical ones in the most significant bits in digital data due to an inherent proportion between intensity values and most significant bits, i.e., the higher intensity values, the more logical ones presented in the most significant bits (see Kaplinsky; col. 11, lines 30-42).

Regarding claim 4, inherent in the combination of Kaplinsky and Baumeister is a number of pixels whose most significant bits include zeros (logical zeros) are also counted since the too dark photodetectors/pixels in Kaplinsky inherently output low intensity values which correspond to logical zeros in the most significant bits in digital data due to an inherent proportion between intensity values and most significant bits, i.e., the lower intensity values, the more logical zeros presented in the most significant bits (see Kaplinsky; col. 11, lines 30-42).

Regarding claim 5, see the analysis in claim 4.

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Regarding claim 7, Kaplinsky discloses that there are two different thresholds set by the user, one for too bright photodetectors and the other for too dark photodetectors (see col. 11, lines 34-38).

Regarding claim 8, as disclosed by Kaplinsky in col. 11, lines 21-42, it is implied that the decision element reduces an exposure time for the overexposed image (too bright image) and increase exposure time for underexposure image (too dark image) since such operations are inherent for the automatic exposure to function properly.

Regarding claim 9, Kaplinsky also discloses three different intensity values being detected and at least one of too bright is detected by one of the implied detector (col. 11, lines 30-33).

Regarding claim 11, Kaplinsky discloses a CCD sensor (col. 8, line 55) but Kaplinsky fails to teach an active pixel sensor with a plurality of pixels of CMOS image sensor, each pixel including an in-pixel buffer transistor and in-pixel selection transistor. However, an Official Notice is taken that such an active CMOS image sensor of an imaging device is well known in the art for a low driving voltage.

Therefore, it would have been obvious to those skilled in the art to implement the image sensor in Kaplinsky with an active CMOS image sensor having in-pixel buffer transistor and in-pixel selection transistor and driven with low voltages as an obvious variant over CCD image sensor in imaging technology.

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Regarding claim 14, see the analysis in claims 1 & 2.

Regarding claim 15, the thresholds in Kaplinsky can be changed by the user (col. 11, lines 35-36). Therefore, the limitation of a memory (an inherent memory) storing the thresholds and the memory being variable to change the thresholds is met.

Regarding claim 16, see the analysis in claims 1, 2 and 15.

Regarding claim 18, see the analysis in claim 3 and note that the two most significant bits must become 11 when highest intensity values are output from the “too bright” photodetectors.

Regarding claim 19, see the analysis in claim 4.

6. Claims 6, 22 & 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplinsky et al (US 5,582,222) and in view of Baumeister (US 4,684,995) and in further view of Van de Poel et al (US 6,061,091).

Regarding claim 6, the combination of Kaplinsky and Baumeister teaches the threshold detectors and the autoexposure control as analyzed in claims 1 & 2 above. However, Kaplinsky and Baumeister fail to suggest that the threshold detectors include values indicative of what

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percentage of the image can have underexposed or overexposed pixels and the exposure is controlled based on the percentages.

Van de Poel teaches an exposure control of an image sensor wherein the under-exposure and over-exposure of an image sensor may be detected based on a certain percentage (i.e., 25%) of pixels having low/high intensity values thereby an exposure control is established (see col. 8, lines 15-24).

Therefore, it would have been obvious to one of ordinary skill in the art to recognize that the threshold detectors in the combination of Kaplinsky and Baumeister would be implemented for the automatic exposure control to indicate a percentage of underexposed or overexposed pixels in an obvious configuration of exposure detection and control in view of Van de Poel.

Regarding claim 22, Kaplinsky shows that the thresholds can be set by the user, meaning that the thresholds are variable (col. 11, lines 34-38). Therefore, it would have been obvious to one of ordinary skill in the art that the user would set the first threshold at about 30% of the total number of the pixels in the image sensor as an obvious setting configuration.

Regarding claim 23, Van de Poel shows that one threshold is set at about 25% of pixels so that the other threshold must be automatically set at about 75% of pixels in a 100% range (see col. 8, lines 15-24).

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7. Claims 10, 20 & 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplinsky et al and Baumeister as applied to claim 2 and in further view of Yamaguchi (US 5,638,123).

Regarding claim 10, Kaplinsky teaches an inherent threshold storing element (see claim 15) and decoding circuit for controlling the integration time of the image sensor ranging from 0000-1011 (col. 11, lines 31-42). However, Kaplinsky does not clearly teach that the threshold storing element further storing first and second increase and decrease increments, an underexposed or overexposed image being increased or decreased, respectively by the first increment, and the seriously underexposed or overexposed image being increased or decreased by the second increment.

Yamaguchi teaches an autoexposure control device utilizing different increments for adjusting the shutter speeds of a camera. According to Yamaguchi, each increment is used for adjusting a suitable shutter speed, such as “very bright” corresponds to “shutter speed up to much degree”, “slight bright” corresponds to “shutter speed up” and etc...(see Fig. 3). Specifically, there are two stored increments of absolute numeric values (i.e., +/- 5 and +/- 1), wherein the “very bright” and “very dark” fall within first increase and decrease increment of absolute numeric 5, which means the shutter speed is controlled by either adding numeric value 5 to or subtracting 5 from current shutter pulse data; and wherein the “slight bright” and “slight dark” fall within second increase and decrease increment of absolute numeric 1, which means the shutter speed is controlled by either adding numeric value 1 to or subtracting 1 from current shutter pulse data (see figs. 2 – 6; col. 7, line 58 – col. 8, line 27).

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It would enhance the autoexposure control of a camera by enabling the threshold storing element to store the first and second increase and decrease thresholds for controlling the corresponding exposure levels of an image since such technique provides “the exposure time T is shortened by a time five times greater than the shutter pulse period every field” and “making it possible to more finely vary the exposure time” as suggested by Yamaguchi in col. 11, lines 34-36 & col. 13, lines 30-31.

Therefore, it would have been obvious to one of ordinary skill in the art to combine Kaplinsky, Baumeister with the teaching of Yamaguchi to make the autoexposure control process more accurate by finely detecting exposure states of the image sensor and varying the exposure time with more than one increment value.

Regarding claims 20 & 21, see the analysis in claim 10.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaplinsky et al (US 5,582,222) and in view of Baumeister (US 4,684,995), Yamaguchi (US 5,638,123) and in further view of Van de Poel et al (US 6,061,091).

Regarding claim 12, see the analysis of claim 10 in section 7 and claims 6, 22 and 23 in section 6. Since the thresholds are variably set by the user in Kaplinsky and Yamaguchi teaches seriously deficient image and less seriously deficient image while Van de Poel teaches detecting such deficient images using percentages. Therefore, it would have been obvious to one of ordinary skill in the art to combine Kaplinsky, Baumeister, Yamaguchi and Van de Poel to

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enhance the autoexposure control with more accuracy by finely detecting exposure state of the image sensor and varying exposure time with more than one increment value, wherein the threshold for seriously deficient image (i.e., too bright image) and the threshold for less seriously deficient image (i.e., slight bright image) would be more than 100% as desired by the user.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (703) 605-4246. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew B Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.

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A handwritten signature in black ink, appearing to read 'A. Christensen', with a long horizontal line extending to the right.

ANDREW CHRISTENSEN
SUPERVISORY PATENT EXAMINER
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